REMARKS

The final Office Action of April 5, 2006, has been received and reviewed.

Claims 1 and 3-31 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections under 35 U.S.C. § 102

Claims 1 and 6-15 are rejected under 35 U.S.C. § 102(e) for reciting subject matter that is allegedly anticipated by the subject matter described in U.S. Patent 6,623,343 to Kajiwara et al. (hereinafter "Kajiwara").

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

It is respectfully submitted that Kajiwara does not expressly or inherently describe a method that includes biasing independently movable pressurization structures to selectively apply a plurality of different amounts of pressure to different, selected locations of a backside of the semiconductor device structure, as recited in independent claim 1.

Kajiwara describes an apparatus that includes concentric tubular pressure rings or bladders 255 that may be independently inflated and pressurized. The bladders 255 are configured to individually apply pressure to a membrane 250 that, in turn, applies pressure to a wafer 230.

The bladders 255 of the apparatus of Kajiwara are not independently movable, as would be required for Kajiwara to expressly or inherently describe each and every element of independent claim 1; instead, they are independently inflatable and pressurizable. When pressurized, they remain in place as air or gases are introduced therein.

Moreover, the bladders 255 of the apparatus of Kajiwara do not individually apply pressure to a surface of a semiconductor device structure. The membrane 250, which includes a

surface 256 that contacts the entire back side 244 of the wafer 230, applies pressure from any combination of the bladders 255 to the back side 244 of the wafer 230. Further, the bladder 250 spreads the pressure applied thereto by any one bladder 255. When multiple bladders 255 apply pressure to the membrane 250, the membrane 250 will inherently even out the pressure applied thereto, in a gradient-type fashion. This characteristic of a membrane of the type described in Kajiwara prevents the bladders 255 from individually applying pressure to a major surface of a semiconductor device structure.

Therefore, Kajiwara does not expressly or inherently describe a method that includes biasing independently movable pressurization structures to selectively apply a plurality of different amounts of pressure to different, selected locations of a backside of the semiconductor device structure, as recited in independent claim 1.

Claims 6-15 are each allowable, among other reasons, for depending from claim 1, which is allowable.

Withdrawal of the 35 U.S.C. § 102(e) rejections of claims 1 and 6-15 is respectfully requested.

Rejections under 35 U.S.C. § 103(a)

Claims 3-5 and 16-31 have been rejected under 35 U.S.C. § 103(a).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both

be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Kajiwara in View of Chen

Claims 3-5 stand rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is assertedly unpatentable over the subject matter taught in Kajiwara, in view of teachings from U.S. Patent 6,436,828 to Chen et al. (hereinafter "Chen").

Claims 3-5 are allowable, among other reasons, for depending from claim 1, which is allowable.

It is also respectfully submitted that each of claims 3-5 is allowable because the Office has not established a *prima facie* case of obviousness against them.

The pertinent teachings of Kajiwara have been summarized above.

Chen teaches a polishing apparatus that includes magnets for controlling the pressure applied to different portions of a substrate. Col. 2, lines 47-52. The apparatus includes a carrier head 100 that supports a flexible membrane 104, or circular sheet. Col. 4, lines 26-32, 45-48; FIG. 2. The flexible membrane 104 includes magnetically sensitive particles distributed therethrough. *Id.* The carrier head 100 also includes three coils, 108, 110, and 112, that are coupled to voltage sources 140, 142, and 144. Col. 4, lines 28-31; col. 5, lines 38-42; FIG. 2. The voltage applied to a coil creates an electrical current, which in turn induces a magnetic field proportional in intensity to the current flowing through the coil. Col. 5, lines 42-46. The carrier head 100 also includes a loading chamber 120 that applies a downward load to the membrane 104. Col. 4, lines 63-67; FIG. 2.

In application, the electric current flowing through the coils 108, 110, and 112 induces a magnetic field that interacts with the magnetic particles 118 in the membrane 104. The magnetic field "create[s] a primary field region in a ...first region of the flexible membrane [104] and a secondary field region ...in a second region of the flexible membrane..." Col. 5, lines 49-55. As one example, activating the third coil 112 "will apply the primary magnetic field to at least the central, intermediate and outer membrane portions 132, 134 and 136." Col. 5, lines 65-67; FIG. 2. Thus, the magnetic fields generated in the method of Chen act across the entire membrane 104 such that the resultant effect in one region of membrane 104 (e.g., 132, 134,

and 136) depends in part on the resultant effect in adjacent regions of membrane 104. Chen demonstrates this interdependence in FIG. 4, which is a graph of the removal rate of a material at various radial positions of a substrate under differing magnetic fields. Col. 6, lines 32-67; col. 7, lines 1-15; FIG. 4.

Thus, as with the membrane 250 of Kajiwara, use of the membrane 104 of Chen does not include biasing independently movable pressurization structures against the backside of a semiconductor device structure.

Therefore, it is respectfully submitted that Kajiwara and Chen, taken either separately or together, do not teach or suggest each and every element of independent claim 1, from which claims 3-5 depend. Moreover, it is respectfully submitted that, in view of the fact that neither Kajiwara nor Chen teaches or suggests an apparatus that includes elements that individually apply pressure to corresponding regions of a semiconductor substrate, one of ordinary skill in the art wouldn't have been motivated to combine the teachings of these references in the asserted manner, or had any reason to expect that their combination in the asserted manner would have been successful.

Rather, it appears that any such motivation could only have been improperly gleaned by the Examiner from the subject matter recited in the claims of the above-referenced application.

As a *prima facie* case of obviousness has not been established, it is respectfully submitted that, under 35 U.S.C. § 103(a), each of claims 3-5 is drawn to subject matter that is allowable over the teachings of Kajiwara and Chen.

Sommer or Chen in View of Williams

Claims 16-31 stand rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is purportedly unpatentable over the teachings of U.S. Patent 6,561,871 to Sommer (hereinafter "Sommer") or Chen, in view of teachings from U.S. Patent 6,594,542 to Williams (hereinafter "Williams").

Sommer teaches a linear drive mechanism for chemical-mechanical planarization. Col. 3, lines 53-56. A substrate carrier 402 carries a substrate (not shown) against a polishing surface of CMP apparatus. Col. 12, lines 8-11; FIG. 11. The carrier plate 402 has several magnets 420,

422, 424, and 426 that facilitate incremental movement of the carrier plate 402 in the X and Y directions (*see, e.g.,* U.S. Patent 3,376,578 referenced and incorporated into Sommer) while providing an attractive force F in the Z direction between the carrier plate 402 and the polishing plate 406. Col. 28-30; FIGS. 11, 13. Alternatively, the magnets 520, 522, 524, and 526 may be permanently mounted in the platen 531. Col. 15, lines 47-53; FIG. 15.

While the magnets of Sommer include protruding regions, the protruding regions appear to have fixed heights. *See, e.g.,* col. 12, lines 23-40; FIGS. 12, 14, and 16. Moreover, it does not appear that the protruding regions of the magnets taught in Sommer may be moved independently from one another. *See, e.g., id.*

The teachings of Chen have been summarized above.

The teachings of Williams relate to a method for controlling material removal rates during chemical-mechanical polishing (CMP) processes. Col. 1, lines 15-19. The method of Williams compensates for inconsistencies in a polishing pad over time, from wafer-to-wafer. Col. 5, lines 17-20. In the method of Williams, a thickness of a wafer 102 is measured prior to polishing a material layer, or film, on the wafer. Col. 6, lines 18-20; FIG. 6. A polishing apparatus 200 polishes the material layer for a predetermined time, during which the pressure "applied by the wafer 102 against the polishing surface 206 is measured and controlled through sensors" on the polishing apparatus. Col. 6, lines 41-47; FIG. 6. After polishing for the predetermined time, an "after polishing" thickness measurement of the wafer 102 is made. Col. 6, lines 53-55. The "before" and "after" thickness measurements are used to calculate a linear estimation factor based on the material removal rate, which is used to adjust the polishing time. Col. 6, lines 55-60. The calculated linear estimation factor, which is based on the measured material removal rates of one or more prior acts of polishing, is used to adjust the durations for which other wafers are subsequently polished so that the polishing pad may be used to remove the same thickness of material from the other wafers. Col. 6, lines 59-62.

It is respectfully submitted that there are several reasons that teachings from Sommer or Chen, in view of the teachings of Williams, do not support a *prima facie* case of obviousness against any of claims 16-31.

First, it is respectfully submitted that none of Sommer, Chen, or Williams, taken separately or in any combination, teaches or suggests each and every claim element. Specifically, with respect to the method of independent claim 16, none of Sommer, Chen, or Williams teaches or suggests a method that includes "selectively applying [pressure] at locations beneath areas of . . . at least one second semiconductor device structure that correspond to . . . raised areas of [a] first semiconductor device structure . . ." Rather, the teachings of Sommer are limited to polishing apparatus that are configured to move substrates linearly, while Chen teaches methods for applying pressure gradients to semiconductor wafers through membranes, and Williams merely teaches methods for adjusting polishing times as polishing pads become less effective.

Second, it is respectfully submitted that, without the benefit of hindsight that the claims of the above-referenced application afford to the Office, one of ordinary skill in the art wouldn't have been motivated to combine teachings from Sommer or Chen with teachings from Williams in the asserted manner. In particular, the teachings of Sommer relate to polishing apparatus with magnets that facilitate incremental movement of a substrate carrier 402 relative to a polishing pad without selectively applying pressure to different locations of a semiconductor device structure, let alone selectively applying pressure in response to the locations of raised areas on a previously polished semiconductor device structure of the same type. Chen teaches a method for applying a pressure gradient to a surface of a semiconductor device structure, but does not teach or suggest doing so in response to raised areas of a previously polished semiconductor device structure of the same type. The teachings of Williams are limited to monitoring for the sake of making adjustments in polishing times as a polishing pad becomes worn or otherwise less effective. None of these references would have provided one of ordinary skill in the art with any motivation to combine their teachings in such a way as to, in response to raised areas noted following polishing of a first semiconductor device structure, selectively apply pressure to at least one second semiconductor device structure of the same type.

Third, it is respectfully submitted that, since none of Sommer, Chen, or Williams teaches or suggests evaluating raised areas of a first semiconductor device following polishing thereof, then using that information to improve the planarity of subsequently polished semiconductor devices of the same type, one of ordinary skill in the art wouldn't have had any reason to expect

that the teachings of Sommer or Chen could have been successfully combined with teachings from Williams in the asserted manner.

Therefore, no combination of teachings from Sommer, Chen, or Williams supports a *prima facie* case of obviousness against independent claim 16 under 35 U.S.C. § 103(a). As such, under 35 U.S.C. § 103(a), the subject matter recited in independent claim 16 is allowable over the subject matter taught in Chen, Sommer, and Williams.

Each of claims 17-31 is allowable, among other reasons, for depending directly or indirectly from claim 16, which is allowable.

Claim 17 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes employing metrology techniques to locate raised areas.

Claim 18 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes applying a sufficient amount of pressure at each of the locations that corresponds to a raised area to form a substantially planar surface on the at least one second semiconductor device structure.

Claim 19 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes selectively applying different amounts of pressure at different locations that correspond to raised areas.

Claim 20 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes determining an appropriate amount of pressure to apply to each of the locations based on a height of each corresponding raised area.

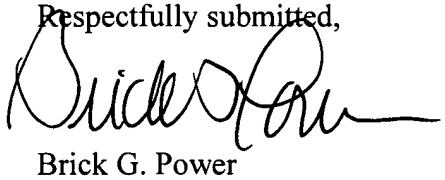
Claim 25 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes biasing at least one pressurization structure against the backside of the at least one second semiconductor device structure after a first semiconductor device structure has been polished and any raised areas thereon have been located.

Withdrawal of the 35 U.S.C. § 103(a) rejections of claims 16-31 is respectfully requested.

CONCLUSION

It is respectfully submitted that each of claims 1 and 3-31 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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